



**MRDT4 – IEC60870-5-103**  
**HighPROTEC**

Data point list

**Manual DOK-TD-MRDT4IDE**

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This manual applies to devices (version):

Version 3.4.a

Build: 35593

## Physical layer

### Electrical interface

EIA RS-485

Number of loads for one equipment: 32

### Optical interface

Glass fibre

F-SMA type connector

Plastic fibre

BFOC/2,5 type connector

### Transmission speed

9600 bit/s

19200 bit/s

38400 bit/s

## Link Layer

There are no choices for the link layer

## Application layer

Transmission mode for application data Mode 1 (least significant octet first) as defined in 4.10 of IEC 60870-5-4

Common address of ADSU

- One common address of ADSU (identical with station address)  More than one common address of ASDU

Selection of standard information numbers in monitor direction

System functions in monitor direction

- 0 = End of general interrogation  0 = Time synchronization  
 2 = Reset FCB  3 = Reset CU  
 4 = Start/Restart  5 = Power on

## Application layer

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### Measurands in monitor direction

- |  |  |
|--|--|
| <input type="checkbox"/> 144 Measurand I   | <input type="checkbox"/> 145 Measurands I,V                              |
| <input type="checkbox"/> 146 Measurand I, V,P,Q  | <input type="checkbox"/> 147 Measurands I <sub>N</sub> , V <sub>EN</sub> |
| <input checked="" type="checkbox"/> 148 Measurands I <sub>L1,2,3</sub> , V <sub>L1,2,3</sub> , P, Q, f |  |

### Generic functions in monitor direction

- |   |  |
|---|--|
| <input type="checkbox"/> 240 Read headings of all defined groups          | <input type="checkbox"/> 241 Read values of all entries of one group |
| <input type="checkbox"/> 243 Read directory of a single entry             | <input type="checkbox"/> 244 Read value of a single entry            |
| <input type="checkbox"/> 245 End of general interrogation of generic data | <input type="checkbox"/> 249 Write entry with confirmation           |
| <input type="checkbox"/> 250 Write entry with execution                   | <input type="checkbox"/> 251 Write entry aborted                     |

### Selection of standard information numbers in control direction

#### System functions in control direction

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> 0 = Initiation of general interrogation | <input checked="" type="checkbox"/> 0 Time synchronization |
|---|--|

General commands in control direction

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> 16 Auto-recloser on/off          | <input checked="" type="checkbox"/> 17 Teleprotection on/off     |
| <input checked="" type="checkbox"/> 18 Protection on/off             | <input checked="" type="checkbox"/> 19 LED reset                 |
| <input checked="" type="checkbox"/> 20 Blocking of Monitor Direction | <input checked="" type="checkbox"/> 21 Test mode                 |
| <input checked="" type="checkbox"/> 23 Activate characteristic 1     | <input checked="" type="checkbox"/> 24 Activate characteristic 2 |
| <input checked="" type="checkbox"/> 25 Activate characteristic 3     | <input checked="" type="checkbox"/> 26 Activate characteristic 4 |

Generic functions in control direction

- |  |  |
|--|--|
| <input type="checkbox"/> 240 Read headings of all defined groups   | <input type="checkbox"/> 241 Read values of all entries of one group |
| <input type="checkbox"/> 243 Read directory of a single entry      | <input type="checkbox"/> 244 Read value of a single entry            |
| <input type="checkbox"/> 245 General interrogation of generic data | <input type="checkbox"/> 248 Write entry                             |
| <input type="checkbox"/> 249 Write entry with confirmation         | <input type="checkbox"/> 250 Write entry with execution              |
| <input type="checkbox"/> 251 Write entry abort                     |  |

Basic application functions

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Test mode        | <input checked="" type="checkbox"/> Blocking of monitor direction |
| <input checked="" type="checkbox"/> Disturbance data | <input type="checkbox"/> Generic services                         |
| <input checked="" type="checkbox"/> Private data     |   |

Application layer

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Miscellaneous

Measurand	max. value = rated value x	
	1.2	2.4
Current L <sub>1</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L <sub>2</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Current L <sub>3</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>1-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>2-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>3-E</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Voltage L <sub>1</sub> – L <sub>2</sub>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Active power P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reactive power Y	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency f	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## Data Points List

### Signals

<b>Module</b> <b>( - ANSI / IEEE Device Number )</b>	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
Prot	active	1	176	18	GI	Signal: active
IEC 103	Block MD active	1	176	20	GI	Signal: The blocking of IEC103 transmission in monitor direction has been activated.
IEC 103	Test mode active	1	176	21	GI	Signal: IEC103 communication has been switched over into Test Mode.
PSet-Switch	min 1 param changed	1	176	22	GI	Signal: At least one parameter has been changed
DI Slot X1	DI 1	1	176	27	GI	Signal: Digital Input
DI Slot X1	DI 2	1	176	28	GI	Signal: Digital Input
DI Slot X1	DI 3	1	176	29	GI	Signal: Digital Input
DI Slot X1	DI 4	1	176	30	GI	Signal: Digital Input
SSV	System Error	1	176	46	GI	Signal: Device Failure
Prot	Alarm L1	2	176	64	GI	Signal: General-Alarm L1
Prot	Alarm L2	2	176	65	GI	Signal: General-Alarm L2
Prot	Alarm L3	2	176	66	GI	Signal: General-Alarm L3
Prot	Alarm G	2	176	67	GI	Signal: General-Alarm - Earth fault
Prot	Trip	2	176	68		Signal: General Trip
Prot	Trip L1	2	176	69		Signal: General Trip L1
Prot	Trip L2	2	176	70		Signal: General Trip L2



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Prot	Trip L3	2	176	71		Signal: General Trip L3
Prot	Alarm	2	176	84	GI	Signal: General Alarm
I[1] - 50, 51	TripCmd	2	176	90		Signal: Trip Command
I[2] - 50, 51	TripCmd	2	176	91		Signal: Trip Command
IG[1] - 50N, 51N	TripCmd	2	176	92		Signal: Trip Command
IG[2] - 50N, 51N	TripCmd	2	176	93		Signal: Trip Command
Ctrl	Local	1	176	160	GI	Switching Authority: Local
Id - 87	active	1	30	50	GI	Signal: active
Id - 87	Blo TripCmd	1	30	60	GI	Signal: Trip Command blocked
Id - 87	Trip L1	2	30	90		Signal: Trip System Phase L1
Id - 87	Trip L2	2	30	91		Signal: Trip System Phase L2
Id - 87	Trip L3	2	30	92		Signal: Trip System Phase L3
Id - 87	TripCmd	2	30	93		Signal: Trip Command
Id - 87	Alarm	2	30	100	GI	Signal: Alarm
Id - 87	Alarm L1	2	30	101	GI	Signal: Alarm System Phase L1
Id - 87	Alarm L2	2	30	102	GI	Signal: Alarm System Phase L2
Id - 87	Alarm L3	2	30	103	GI	Signal: Alarm System L3
Id - 87	Restraining	1	30	120	GI	Signal: Restraining of the differential protection by means of rising the tripping curve.
Id - 87	Transient	1	30	121	GI	Signal: Temporary stabilization of the differential protection afterwards the transformer is being energized.

Data Points List

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Id - 87	IH2 Blo L1	1	30	122	GI	Signal:Phase L1: Blocking of the Phase Differential Protection because of second Harmonic.
Id - 87	IH2 Blo L2	1	30	123	GI	Signal:Phase L2: Blocking of the Phase Differential Protection because of second Harmonic.
Id - 87	IH2 Blo L3	1	30	124	GI	Signal:Phase L3: Blocking of the Phase Differential Protection because of second Harmonic.
Id - 87	IH4 Blo L1	1	30	125	GI	Signal:Phase L1: Blocking of the Phase Differential Protection because of fourth Harmonic.
Id - 87	IH4 Blo L2	1	30	126	GI	Signal:Phase L2: Blocking of the Phase Differential Protection because of fourth Harmonic.
Id - 87	IH4 Blo L3	1	30	127	GI	Signal:Phase L3: Blocking of the Phase Differential Protection because of fourth Harmonic.
Id - 87	IH5 Blo L1	1	30	128	GI	Signal:Phase L1: Blocking of the Phase Differential Protection because of fifth Harmonic.
Id - 87	IH5 Blo L2	1	30	129	GI	Signal:Phase L2: Blocking of the Phase Differential Protection because of fifth Harmonic.
Id - 87	IH5 Blo L3	1	30	130	GI	Signal:Phase L3: Blocking of the Phase Differential Protection because of fifth Harmonic.
IdH - 87	active	1	31	50	GI	Signal: active
IdH - 87	Blo TripCmd	1	31	60	GI	Signal: Trip Command blocked

Data Points List

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IdH - 87	Trip L1	2	31	90		Signal: Trip System Phase L1
IdH - 87	Trip L2	2	31	91		Signal: Trip System Phase L2
IdH - 87	Trip L3	2	31	92		Signal: Trip System Phase L3
IdH - 87	TripCmd	2	31	93		Signal: Trip Command
IdH - 87	Alarm	2	31	100	GI	Signal: Alarm
IdH - 87	Alarm L1	2	31	101	GI	Signal: Alarm System Phase L1
IdH - 87	Alarm L2	2	31	102	GI	Signal: Alarm System Phase L2
IdH - 87	Alarm L3	2	31	103	GI	Signal: Alarm System L3
IdG[1] - 87N	active	1	32	50	GI	Signal: active
IdG[2] - 87N	active	1	32	51	GI	Signal: active
IdGH[1] - 87N	active	1	32	52	GI	Signal: active
IdGH[2] - 87N	active	1	32	53	GI	Signal: active
IdG[1] - 87N	Blo TripCmd	1	32	60	GI	Signal: Trip Command blocked
IdG[2] - 87N	Blo TripCmd	1	32	61	GI	Signal: Trip Command blocked
IdGH[1] - 87N	Blo TripCmd	1	32	62	GI	Signal: Trip Command blocked
IdGH[2] - 87N	Blo TripCmd	1	32	63	GI	Signal: Trip Command blocked
IdG[1] - 87N	TripCmd	2	32	92		Signal: Trip Command
IdG[2] - 87N	TripCmd	2	32	93		Signal: Trip Command
IdGH[1] - 87N	TripCmd	2	32	94		Signal: Trip Command
IdGH[2] - 87N	TripCmd	2	32	95		Signal: Trip Command
IdG[1] - 87N	Alarm	2	32	100	GI	Signal: Alarm
IdG[2] - 87N	Alarm	2	32	101	GI	Signal: Alarm
IdGH[1] - 87N	Alarm	2	32	102	GI	Signal: Alarm

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IdGH[2] - 87N	Alarm	2	32	103	GI	Signal: Alarm
RTD	TripCmd	2	46	90		Signal: Trip Command
RTD	Alarm	2	46	100	GI	Alarm RTD Temperature Protection
IEC 103	Failure Event lost	1	100	100		Failure event lost
I[1] - 50, 51	active	1	101	50	GI	Signal: active
I[2] - 50, 51	active	1	101	51	GI	Signal: active
I[3] - 50, 51	active	1	101	52	GI	Signal: active
I[4] - 50, 51	active	1	101	53	GI	Signal: active
I[5] - 50, 51	active	1	101	54	GI	Signal: active
I[6] - 50, 51	active	1	101	55	GI	Signal: active
IG[1] - 50N, 51N	active	1	101	56	GI	Signal: active
IG[2] - 50N, 51N	active	1	101	57	GI	Signal: active
IG[3] - 50N, 51N	active	1	101	58	GI	Signal: active
IG[4] - 50N, 51N	active	1	101	59	GI	Signal: active
I[1] - 50, 51	Blo TripCmd	1	101	60	GI	Signal: Trip Command blocked
I[2] - 50, 51	Blo TripCmd	1	101	61	GI	Signal: Trip Command blocked
I[3] - 50, 51	Blo TripCmd	1	101	62	GI	Signal: Trip Command blocked
I[4] - 50, 51	Blo TripCmd	1	101	63	GI	Signal: Trip Command blocked
I[5] - 50, 51	Blo TripCmd	1	101	64	GI	Signal: Trip Command blocked
I[6] - 50, 51	Blo TripCmd	1	101	65	GI	Signal: Trip Command blocked
IG[1] - 50N, 51N	Blo TripCmd	1	101	66	GI	Signal: Trip Command blocked
IG[2] - 50N, 51N	Blo TripCmd	1	101	67	GI	Signal: Trip Command blocked
IG[3] - 50N, 51N	Blo TripCmd	1	101	68	GI	Signal: Trip Command blocked

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IG[4] - 50N, 51N	Blo TripCmd	1	101	69	GI	Signal: Trip Command blocked
I[3] - 50, 51	TripCmd	2	101	92		Signal: Trip Command
I[4] - 50, 51	TripCmd	2	101	93		Signal: Trip Command
I[5] - 50, 51	TripCmd	2	101	94		Signal: Trip Command
I[6] - 50, 51	TripCmd	2	101	95		Signal: Trip Command
IG[3] - 50N, 51N	TripCmd	2	101	98		Signal: Trip Command
IG[4] - 50N, 51N	TripCmd	2	101	99		Signal: Trip Command
I[1] - 50, 51	Alarm	2	101	100	GI	Signal: Alarm
I[2] - 50, 51	Alarm	2	101	101	GI	Signal: Alarm
I[3] - 50, 51	Alarm	2	101	102	GI	Signal: Alarm
I[4] - 50, 51	Alarm	2	101	103	GI	Signal: Alarm
I[5] - 50, 51	Alarm	2	101	104	GI	Signal: Alarm
I[6] - 50, 51	Alarm	2	101	105	GI	Signal: Alarm
IG[1] - 50N, 51N	Alarm	2	101	106	GI	Signal: Alarm IG
IG[2] - 50N, 51N	Alarm	2	101	107	GI	Signal: Alarm IG
IG[3] - 50N, 51N	Alarm	2	101	108	GI	Signal: Alarm IG
IG[4] - 50N, 51N	Alarm	2	101	109	GI	Signal: Alarm IG
ThR - 49	active	1	102	50	GI	Signal: active
ThR - 49	Blo TripCmd	1	102	60	GI	Signal: Trip Command blocked
ThR - 49	TripCmd	2	102	90		Signal: Trip Command
ThR - 49	Alarm	2	102	100	GI	Signal: Alarm Thermal Overload
I2>[1] - 46	active	1	103	56	GI	Signal: active
I2>[2] - 46	active	1	103	57	GI	Signal: active

Data Points List

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I2>[1] - 46	Blo TripCmd	1	103	66	GI	Signal: Trip Command blocked
I2>[2] - 46	Blo TripCmd	1	103	67	GI	Signal: Trip Command blocked
I2>[1] - 46	TripCmd	2	103	90		Signal: Trip Command
I2>[2] - 46	TripCmd	2	103	91		Signal: Trip Command
I2>[1] - 46	Alarm	2	103	100	GI	Signal: Alarm Negative Sequence
I2>[2] - 46	Alarm	2	103	101	GI	Signal: Alarm Negative Sequence
CBF[1] - 50BF, 62BF	active	1	108	50	GI	Signal: active
CBF[2] - 50BF, 62BF	active	1	108	51	GI	Signal: active
CBF[1] - 50BF, 62BF	running	1	108	60	GI	Signal: CBF-Module started
CBF[2] - 50BF, 62BF	running	1	108	61	GI	Signal: CBF-Module started
CBF[1] - 50BF, 62BF	Alarm	1	108	85		Signal: Circuit Breaker Failure
CBF[2] - 50BF, 62BF	Alarm	1	108	86		Signal: Circuit Breaker Failure
CBF[1] - 50BF, 62BF	Trigger1-I	1	108	100	GI	Module Input: Trigger that will start the CBF
CBF[1] - 50BF, 62BF	Trigger2-I	1	108	101	GI	Module Input: Trigger that will start the CBF
CBF[1] - 50BF, 62BF	Trigger3-I	1	108	102	GI	Module Input: Trigger that will start the CBF
CBF[2] - 50BF, 62BF	Trigger1-I	1	108	103	GI	Module Input: Trigger that will start the CBF
CBF[2] - 50BF, 62BF	Trigger2-I	1	108	104	GI	Module Input: Trigger that will start the CBF
CBF[2] - 50BF, 62BF	Trigger3-I	1	108	105	GI	Module Input: Trigger that will start the CBF
CBF[1] - 50BF, 62BF	Lockout	1	108	106	GI	Signal: Lockout
CBF[1] - 50BF, 62BF	Waiting for Trigger	1	108	107	GI	Waiting for Trigger
CBF[2] - 50BF, 62BF	Lockout	1	108	108	GI	Signal: Lockout
CBF[2] - 50BF, 62BF	Waiting for Trigger	1	108	109	GI	Waiting for Trigger
Ext Oil Temp	Trip-I	2	113	40	GI	Module input state: Trip

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Ext Sudd Press	Trip-I	2	113	41	GI	Module input state: Trip
Ext Temp Superv[1]	Trip-I	2	113	42	GI	Module input state: Trip
Ext Temp Superv[2]	Trip-I	2	113	43	GI	Module input state: Trip
Ext Temp Superv[3]	Trip-I	2	113	44	GI	Module input state: Trip
Ext Oil Temp	active	1	113	50	GI	Signal: active
Ext Sudd Press	active	1	113	51	GI	Signal: active
Ext Temp Superv[1]	active	1	113	52	GI	Signal: active
Ext Temp Superv[2]	active	1	113	53	GI	Signal: active
Ext Temp Superv[3]	active	1	113	54	GI	Signal: active
Ext Oil Temp	Blo TripCmd	1	113	60	GI	Signal: Trip Command blocked
Ext Sudd Press	Blo TripCmd	1	113	61	GI	Signal: Trip Command blocked
Ext Temp Superv[1]	Blo TripCmd	1	113	62	GI	Signal: Trip Command blocked
Ext Temp Superv[2]	Blo TripCmd	1	113	63	GI	Signal: Trip Command blocked
Ext Temp Superv[3]	Blo TripCmd	1	113	64	GI	Signal: Trip Command blocked
Ext Oil Temp	TripCmd	2	113	90		Signal: Trip Command
Ext Sudd Press	TripCmd	2	113	91		Signal: Trip Command
Ext Temp Superv[1]	TripCmd	2	113	92		Signal: Trip Command
Ext Temp Superv[2]	TripCmd	2	113	93		Signal: Trip Command
Ext Temp Superv[3]	TripCmd	2	113	94		Signal: Trip Command
Ext Oil Temp	Alarm	2	113	100	GI	Signal: Alarm
Ext Sudd Press	Alarm	2	113	101	GI	Signal: Alarm
Ext Temp Superv[1]	Alarm	2	113	102	GI	Signal: Alarm
Ext Temp Superv[2]	Alarm	2	113	103	GI	Signal: Alarm

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Ext Temp Superv[3]	Alarm	2	113	104	GI	Signal: Alarm
Exp[1]	active	1	114	50	GI	Signal: active
Exp[2]	active	1	114	51	GI	Signal: active
Exp[3]	active	1	114	52	GI	Signal: active
Exp[4]	active	1	114	53	GI	Signal: active
Exp[1]	Blo TripCmd	1	114	60	GI	Signal: Trip Command blocked
Exp[2]	Blo TripCmd	1	114	61	GI	Signal: Trip Command blocked
Exp[3]	Blo TripCmd	1	114	62	GI	Signal: Trip Command blocked
Exp[4]	Blo TripCmd	1	114	63	GI	Signal: Trip Command blocked
Exp[1]	TripCmd	2	114	90		Signal: Trip Command
Exp[2]	TripCmd	2	114	91		Signal: Trip Command
Exp[3]	TripCmd	2	114	92		Signal: Trip Command
Exp[4]	TripCmd	2	114	93		Signal: Trip Command
Exp[1]	Alarm	2	114	100	GI	Signal: Alarm
Exp[2]	Alarm	2	114	101	GI	Signal: Alarm
Exp[3]	Alarm	2	114	102	GI	Signal: Alarm
Exp[4]	Alarm	2	114	103	GI	Signal: Alarm
SOTF	active	1	115	50	GI	Signal: active
CLPU	active	1	115	51	GI	Signal: active
CLPU	enabled	2	115	91		Signal: Cold Load enabled
CTS[1] - 60L	active	1	118	50	GI	Signal: active
CTS[2] - 60L	active	1	118	51	GI	Signal: active
DI Slot X1	DI 5	1	121	27	GI	Signal: Digital Input



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
DI Slot X1	DI 6	1	121	28	GI	Signal: Digital Input
DI Slot X1	DI 7	1	121	29	GI	Signal: Digital Input
DI Slot X1	DI 8	1	121	30	GI	Signal: Digital Input
DI Slot X6	DI 1	1	121	31	GI	Signal: Digital Input
DI Slot X6	DI 2	1	121	32	GI	Signal: Digital Input
DI Slot X6	DI 3	1	121	33	GI	Signal: Digital Input
DI Slot X6	DI 4	1	121	34	GI	Signal: Digital Input
DI Slot X6	DI 5	1	121	35	GI	Signal: Digital Input
DI Slot X6	DI 6	1	121	36	GI	Signal: Digital Input
DI Slot X6	DI 7	1	121	37	GI	Signal: Digital Input
DI Slot X6	DI 8	1	121	38	GI	Signal: Digital Input
BO Slot X2	BO 1	1	123	160	GI	Signal: Binary Output Relay
BO Slot X2	BO 2	1	123	161	GI	Signal: Binary Output Relay
BO Slot X2	BO 3	1	123	162	GI	Signal: Binary Output Relay
BO Slot X2	BO 4	1	123	163	GI	Signal: Binary Output Relay
BO Slot X2	BO 5	1	123	164	GI	Signal: Binary Output Relay
BO Slot X2	BO 6	1	123	165	GI	Signal: Binary Output Relay
BO Slot X5	BO 1	1	123	166	GI	Signal: Binary Output Relay
BO Slot X5	BO 2	1	123	167	GI	Signal: Binary Output Relay
BO Slot X5	BO 3	1	123	168	GI	Signal: Binary Output Relay
BO Slot X5	BO 4	1	123	169	GI	Signal: Binary Output Relay
BO Slot X5	BO 5	1	123	170	GI	Signal: Binary Output Relay
BO Slot X5	BO 6	1	123	171	GI	Signal: Binary Output Relay

Data Points List

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Logics	LE1.Gate Out	1	162	160	GI	Signal: Output of the logic gate
Logics	LE1.Timer Out	1	162	161	GI	Signal: Timer Output
Logics	LE1.Out	1	162	162	GI	Signal: Latched Output (Q)
Logics	LE2.Gate Out	1	162	167	GI	Signal: Output of the logic gate
Logics	LE2.Timer Out	1	162	168	GI	Signal: Timer Output
Logics	LE2.Out	1	162	169	GI	Signal: Latched Output (Q)
Logics	LE3.Gate Out	1	162	174	GI	Signal: Output of the logic gate
Logics	LE3.Timer Out	1	162	175	GI	Signal: Timer Output
Logics	LE3.Out	1	162	176	GI	Signal: Latched Output (Q)
Logics	LE4.Gate Out	1	162	181	GI	Signal: Output of the logic gate
Logics	LE4.Timer Out	1	162	182	GI	Signal: Timer Output
Logics	LE4.Out	1	162	183	GI	Signal: Latched Output (Q)
Logics	LE5.Gate Out	1	162	188	GI	Signal: Output of the logic gate
Logics	LE5.Timer Out	1	162	189	GI	Signal: Timer Output
Logics	LE5.Out	1	162	190	GI	Signal: Latched Output (Q)
Logics	LE6.Gate Out	1	162	195	GI	Signal: Output of the logic gate
Logics	LE6.Timer Out	1	162	196	GI	Signal: Timer Output
Logics	LE6.Out	1	162	197	GI	Signal: Latched Output (Q)
Logics	LE7.Gate Out	1	162	202	GI	Signal: Output of the logic gate
Logics	LE7.Timer Out	1	162	203	GI	Signal: Timer Output
Logics	LE7.Out	1	162	204	GI	Signal: Latched Output (Q)
Logics	LE8.Gate Out	1	162	209	GI	Signal: Output of the logic gate
Logics	LE8.Timer Out	1	162	210	GI	Signal: Timer Output

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Logics	LE8.Out	1	162	211	GI	Signal: Latched Output (Q)
Logics	LE9.Gate Out	1	162	216	GI	Signal: Output of the logic gate
Logics	LE9.Timer Out	1	162	217	GI	Signal: Timer Output
Logics	LE9.Out	1	162	218	GI	Signal: Latched Output (Q)
Logics	LE10.Gate Out	1	162	223	GI	Signal: Output of the logic gate
Logics	LE10.Timer Out	1	162	224	GI	Signal: Timer Output
Logics	LE10.Out	1	162	225	GI	Signal: Latched Output (Q)
Logics	LE11.Gate Out	1	163	160	GI	Signal: Output of the logic gate
Logics	LE11.Timer Out	1	163	161	GI	Signal: Timer Output
Logics	LE11.Out	1	163	162	GI	Signal: Latched Output (Q)
Logics	LE11.Gate In1-I	1	163	163	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In2-I	1	163	164	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In3-I	1	163	165	GI	State of the module input: Assignment of the Input Signal
Logics	LE11.Gate In4-I	1	163	166	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate Out	1	163	167	GI	Signal: Output of the logic gate
Logics	LE12.Timer Out	1	163	168	GI	Signal: Timer Output
Logics	LE12.Out	1	163	169	GI	Signal: Latched Output (Q)
Logics	LE12.Gate In1-I	1	163	170	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate In2-I	1	163	171	GI	State of the module input: Assignment of the Input Signal

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Logics	LE12.Gate In3-I	1	163	172	GI	State of the module input: Assignment of the Input Signal
Logics	LE12.Gate In4-I	1	163	173	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate Out	1	163	174	GI	Signal: Output of the logic gate
Logics	LE13.Timer Out	1	163	175	GI	Signal: Timer Output
Logics	LE13.Out	1	163	176	GI	Signal: Latched Output (Q)
Logics	LE13.Gate In1-I	1	163	177	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate In2-I	1	163	178	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate In3-I	1	163	179	GI	State of the module input: Assignment of the Input Signal
Logics	LE13.Gate In4-I	1	163	180	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate Out	1	163	181	GI	Signal: Output of the logic gate
Logics	LE14.Timer Out	1	163	182	GI	Signal: Timer Output
Logics	LE14.Out	1	163	183	GI	Signal: Latched Output (Q)
Logics	LE14.Gate In1-I	1	163	184	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In2-I	1	163	185	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In3-I	1	163	186	GI	State of the module input: Assignment of the Input Signal
Logics	LE14.Gate In4-I	1	163	187	GI	State of the module input: Assignment of the Input Signal

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Logics	LE15.Gate Out	1	163	188	GI	Signal: Output of the logic gate
Logics	LE15.Timer Out	1	163	189	GI	Signal: Timer Output
Logics	LE15.Out	1	163	190	GI	Signal: Latched Output (Q)
Logics	LE15.Gate In1-I	1	163	191	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate In2-I	1	163	192	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate In3-I	1	163	193	GI	State of the module input: Assignment of the Input Signal
Logics	LE15.Gate In4-I	1	163	194	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate Out	1	163	195	GI	Signal: Output of the logic gate
Logics	LE16.Timer Out	1	163	196	GI	Signal: Timer Output
Logics	LE16.Out	1	163	197	GI	Signal: Latched Output (Q)
Logics	LE16.Gate In1-I	1	163	198	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In2-I	1	163	199	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In3-I	1	163	200	GI	State of the module input: Assignment of the Input Signal
Logics	LE16.Gate In4-I	1	163	201	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate Out	1	163	202	GI	Signal: Output of the logic gate
Logics	LE17.Timer Out	1	163	203	GI	Signal: Timer Output
Logics	LE17.Out	1	163	204	GI	Signal: Latched Output (Q)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Logics	LE17.Gate In1-I	1	163	205	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In2-I	1	163	206	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In3-I	1	163	207	GI	State of the module input: Assignment of the Input Signal
Logics	LE17.Gate In4-I	1	163	208	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate Out	1	163	209	GI	Signal: Output of the logic gate
Logics	LE18.Timer Out	1	163	210	GI	Signal: Timer Output
Logics	LE18.Out	1	163	211	GI	Signal: Latched Output (Q)
Logics	LE18.Gate In1-I	1	163	212	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In2-I	1	163	213	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In3-I	1	163	214	GI	State of the module input: Assignment of the Input Signal
Logics	LE18.Gate In4-I	1	163	215	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate Out	1	163	216	GI	Signal: Output of the logic gate
Logics	LE19.Timer Out	1	163	217	GI	Signal: Timer Output
Logics	LE19.Out	1	163	218	GI	Signal: Latched Output (Q)
Logics	LE19.Gate In1-I	1	163	219	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate In2-I	1	163	220	GI	State of the module input: Assignment of the Input Signal

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Logics	LE19.Gate In3-I	1	163	221	GI	State of the module input: Assignment of the Input Signal
Logics	LE19.Gate In4-I	1	163	222	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate Out	1	163	223	GI	Signal: Output of the logic gate
Logics	LE20.Timer Out	1	163	224	GI	Signal: Timer Output
Logics	LE20.Out	1	163	225	GI	Signal: Latched Output (Q)
Logics	LE20.Gate In1-I	1	163	226	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate In2-I	1	163	227	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate In3-I	1	163	228	GI	State of the module input: Assignment of the Input Signal
Logics	LE20.Gate In4-I	1	163	229	GI	State of the module input: Assignment of the Input Signal
IH2[1]	active	1	180	50	GI	Signal: active
IH2[1]	Blo L1	1	180	60		Signal: Blocked L1
IH2[1]	Blo L2	1	180	61		Signal: Blocked L2
IH2[1]	Blo L3	1	180	62		Signal: Blocked L3
IH2[1]	Blo IG meas	1	180	63		Signal: Blocking of the ground (earth) protection module (measured ground current)
IH2[1]	3-ph Blo	1	180	64		Signal: Inrush was detected in at least one phase - trip command blocked.

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
IH2[1]	Blo IG calc	1	180	65		Signal: Blocking of the ground (earth) protection module (calculated ground current)
IH2[2]	active	1	181	50	GI	Signal: active
IH2[2]	Blo L1	1	181	60		Signal: Blocked L1
IH2[2]	Blo L2	1	181	61		Signal: Blocked L2
IH2[2]	Blo L3	1	181	62		Signal: Blocked L3
IH2[2]	Blo IG meas	1	181	63		Signal: Blocking of the ground (earth) protection module (measured ground current)
IH2[2]	3-ph Blo	1	181	64		Signal: Inrush was detected in at least one phase - trip command blocked.
IH2[2]	Blo IG calc	1	181	65		Signal: Blocking of the ground (earth) protection module (calculated ground current)
SysA	active	1	182	50	GI	Signal: active
SysA	Alm Current Demd	2	182	106	GI	Signal: Alarm averaged demand current
SysA	Alarm I THD	2	182	107	GI	Signal: Alarm Total Harmonic Distortion Current
SysA	Trip Current Demand	2	182	96		Signal: Trip averaged demand current
SysA	Trip I THD	2	182	97		Signal: Trip Total Harmonic Distortion Current
TCS[1] - 74TC	active	1	241	50	GI	Signal: active
TCS[2] - 74TC	active	1	241	51	GI	Signal: active
TCS[1] - 74TC	ExBlo	1	241	80		Signal: External Blocking



Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
TCS[2] - 74TC	ExBlo	1	241	81		Signal: External Blocking
TCS[1] - 74TC	Alarm	1	241	100	GI	Signal: Alarm Trip Circuit Supervision
TCS[2] - 74TC	Alarm	1	241	101	GI	Signal: Alarm Trip Circuit Supervision
TCS[1] - 74TC	Not Possible	1	241	110	GI	Not possible because no state indicator assigned to the breaker.
TCS[2] - 74TC	Not Possible	1	241	111	GI	Not possible because no state indicator assigned to the breaker.
SG[1]	Operations Alarm	1	242	104	GI	Signal: Service Alarm, too many Operations
SG[2]	Operations Alarm	1	242	109		Signal: Service Alarm, too many Operations
SG[1]	WearLevel Alarm	1	242	130	GI	Signal: Threshold for the Alarm
SG[1]	WearLevel Lockout	1	242	131	GI	Signal: Threshold for the Lockout Level
SG[2]	WearLevel Alarm	1	242	132	GI	Signal: Threshold for the Alarm
SG[2]	WearLevel Lockout	1	242	133	GI	Signal: Threshold for the Lockout Level
Ctrl	SG Disturb	1	246	32	GI	Minimum one Switchgear is disturbed.
Ctrl	SG Indeterm	1	246	33	GI	Minimum one Switchgear is moving (Position cannot be determined).
SG[1]	Prot ON	1	246	113		Signal: ON Command issued by the Prot module
SG[1]	TripCmd	2	246	114		Signal: Trip Command
SG[1]	Ready	1	246	120	GI	Signal: Circuit breaker is ready for operation.
SG[2]	Prot ON	1	247	113		Signal: ON Command issued by the Prot module
SG[2]	TripCmd	2	247	114		Signal: Trip Command
SG[2]	Ready	1	247	120	GI	Signal: Circuit breaker is ready for operation.

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
Scada Cmd	PS 1	1	176	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	1	176	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	1	176	25	GI	Signal: Parameter Set 3
Scada Cmd	PS 4	1	176	26	GI	Signal: Parameter Set 4
SG[1]	Pos	1	131	32	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)
SG[2]	Pos	1	131	33	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)

## Measuring Values

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroup</b> <b>Names</b> <b>Functions</b>	<b>Function type</b> <b>ASDU</b>	<b>Function code</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Factor</b>	<b>Position</b>	<b>Description</b>
CT W1	IL1 [%]	9	176	148	2.4	0	Measured value: Phase current (fundamental)
CT W1	IL2 [%]	9	176	148	2.4	1	Measured value: Phase current (fundamental)
CT W1	IL3 [%]	9	176	148	2.4	2	Measured value: Phase current (fundamental)
CT W1	IL1 [%]	9	152	148	2.4	0	Measured value: Phase current (fundamental)
CT W1	IL2 [%]	9	152	148	2.4	1	Measured value: Phase current (fundamental)
CT W1	IL3 [%]	9	152	148	2.4	2	Measured value: Phase current (fundamental)
CT W1	IG meas [%]	9	152	148	2.4	3	Measured value (measured): IG (fundamental)
CT W2	IL1 [%]	9	152	148	2.4	15	Measured value: Phase current (fundamental)
CT W2	IL2 [%]	9	152	148	2.4	16	Measured value: Phase current (fundamental)
CT W2	IL3 [%]	9	152	148	2.4	17	Measured value: Phase current (fundamental)

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroup Names</b> <b>Functions</b>	<b>Function type</b> <b>ASDU</b>	<b>Function code</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Factor</b>	<b>Position</b>	<b>Description</b>
CT W2	IG meas [%]	9	152	148	2.4	18	Measured value (measured): IG (fundamental)

### Fault Values

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
CT W1	IL1	4	92	150		Measured value: Phase current (fundamental)
CT W1	IL2	4	92	151		Measured value: Phase current (fundamental)
CT W1	IL3	4	92	152		Measured value: Phase current (fundamental)
CT W2	IL1	4	92	153		Measured value: Phase current (fundamental)
CT W2	IL2	4	92	154		Measured value: Phase current (fundamental)
CT W2	IL3	4	92	155		Measured value: Phase current (fundamental)
CT W1	IG meas	4	92	186		Measured value (measured): IG (fundamental)
CT W2	IG meas	4	92	187		Measured value (measured): IG (fundamental)
Id	Id L1	4	93	150		Measured value (calculated): Differential Current Phase L1

## Data Points List

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
Id	Id L2	4	93	151		Measured value (calculated): Differential Current Phase L2
Id	Id L3	4	93	152		Measured value (calculated): Differential Current Phase L3
Id	Is L1	4	93	153		Measured value (calculated): Restraint Current Phase L1
Id	Is L2	4	93	154		Measured value (calculated): Restraint Current Phase L2
Id	Is L3	4	93	155		Measured value (calculated): Restraint Current Phase L3

## Energy Values

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
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The unit of measurement for the energy values is always kWh, independent of the setting "Energy Units" [Device Para / Measurem Display / General settings]. Therefore we recommend to adapt this setting, i. e. change the "Energy Units" setting to kWh. Otherwise the precision of the measurement value might decrease.

**Function type ASDU 195:**

Type identification	195
Variable structure qualifier	129
Cause of transmission	1 or 7
Device address	
Function type	See Data point table
Information number	See Data point table
Data byte 1.1	Counter value1 (currently not used)
Data byte 1.2	
Data byte 1.3	
Data byte 1.4	
Data byte 2.1	Counter value 2
Data byte 2.2	
Data byte 2.3	
Data byte 2.4	
ms	Timestamp
min	
h	

## Commands

<b>Module</b> ( - ANSI / IEEE Device Number )	<b>Subgroups</b> <b>Names</b> <b>Functions</b>	<b>Function Type</b> <b>ASDU</b>	<b>Function</b> <b>(FUN)</b>	<b>Information</b> <b>Number (INF)</b>	<b>Device</b> <b>Interrogation</b>	<b>Description</b>
Scada Cmd	Ack LED	20	176	19		Signal: LEDs acknowledgement
Scada Cmd	PS 1	20	176	23	GI	Signal: Parameter Set 1
Scada Cmd	PS 2	20	176	24	GI	Signal: Parameter Set 2
Scada Cmd	PS 3	20	176	25	GI	Signal: Parameter Set 3
Scada Cmd	PS 4	20	176	26	GI	Signal: Parameter Set 4
Scada Cmd	Scada Cmd 1	20	130	15		Scada Command
Scada Cmd	Scada Cmd 2	20	130	16		Scada Command
Scada Cmd	Scada Cmd 3	20	130	17		Scada Command
Scada Cmd	Scada Cmd 4	20	130	18		Scada Command
Scada Cmd	Scada Cmd 5	20	130	19		Scada Command
Scada Cmd	Scada Cmd 6	20	130	20		Scada Command
Scada Cmd	Scada Cmd 7	20	130	21		Scada Command
Scada Cmd	Scada Cmd 8	20	130	22		Scada Command
Scada Cmd	Scada Cmd 9	20	130	23		Scada Command
Scada Cmd	Scada Cmd 10	20	130	24		Scada Command
Scada Cmd	Ack BO	20	130	40		Signal: Acknowledgement of the Binary Outputs
Scada Cmd	Ack TripCmd	20	130	41		Signal: Reset Trip Command
SG[1]	Pos	20	131	32	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)

Data Points List

<b>Module ( - ANSI / IEEE Device Number )</b>	<b>Subgroups Names Functions</b>	<b>Function Type ASDU</b>	<b>Function (FUN)</b>	<b>Information Number (INF)</b>	<b>Device Interrogation</b>	<b>Description</b>
SG[2]	Pos	20	131	33	GI	Signal: Circuit Breaker Position (0 = Indeterminate, 1 = OFF, 2 = ON, 3 = Disturbed)



## Analog Traces

<b>Module</b>	<b>IEC60870-5-103 Channel Number</b>	<b>Desc</b>
I L1	70	Analog trace I L1
I L2	71	Analog trace I L2
I L3	72	Analog trace I L3
IG	73	Analog trace IG
I L1	74	Analog trace I L1
I L2	75	Analog trace I L2
I L3	76	Analog trace I L3
IG	77	Analog trace IG
W1.IdG	78	Winding 1.Measured value (calculated): Ground Differential Current IdG
W2.IdG	79	Winding 2.Measured value (calculated): Ground Differential Current IdG
Id L1	80	Measured value (calculated): Differential Current Phase L1
Id L2	81	Measured value (calculated): Differential Current Phase L2
Id L3	82	Measured value (calculated): Differential Current Phase L3
W1.IsG	83	Winding 1.Measured value (calculated): Ground Stabilizing Current
W2.IsG	84	Winding 2.Measured value (calculated): Ground Stabilizing Current
Is L1	85	Measured value (calculated): Restraint Current Phase L1
Is L2	86	Measured value (calculated): Restraint Current Phase L2
Is L3	87	Measured value (calculated): Restraint Current Phase L3



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